December 1971

Brief 71-10505

NASA TECH BRIEF

Langley Research Center

Measuring Internal Dimensions of Small Transparent Objects

The problem:

Measure the dimensions of an internal orifice or other contour in a transparent object.

The solution:

Individually photograph first the orifice in the transparent object and then a microscopic scale immersed in a liquid having the same index of refraction as the transparent object. Using the photograph of the scale, measure the photograph of the orifice.

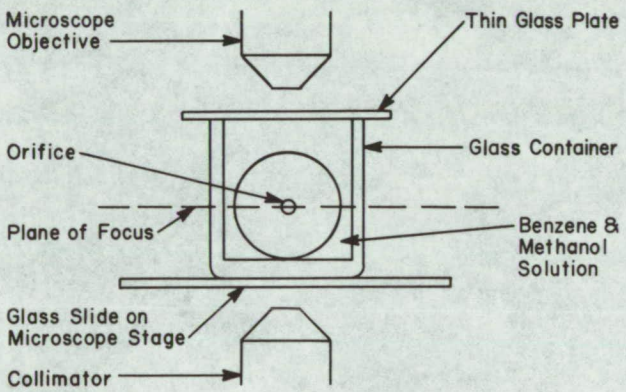

Figure 1.

How it's done:

Immerse the transparent object in a liquid having the same index of refraction (Fig. 1). The boundaries of the orifice appear as dark lines and may be photomicrographed (Fig. 2). A second photomicrograph of a calibrated microscope recticle slide (Fig. 3) is made using the same lens combination, with the slide immersed in the same fluid. It is necessary to completely fill the container and to place a thin glass plate directly on the surface of the liquid in order to eliminate vibration resulting from evaporation.

This technique has been used to measure internal dimensions of objects up to one half inch in diameter with an accuracy of 0.00008 inch, using a long working distance objective.

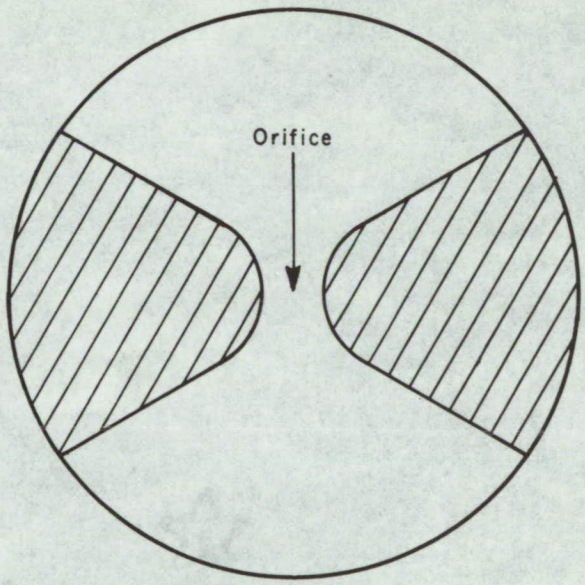

Figure 2. Microscopic View of Orifice

Note:

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
Langley Research Center
Langley Station
Hampton, Virginia 23365
Reference: B71-10505

(continued overleaf)

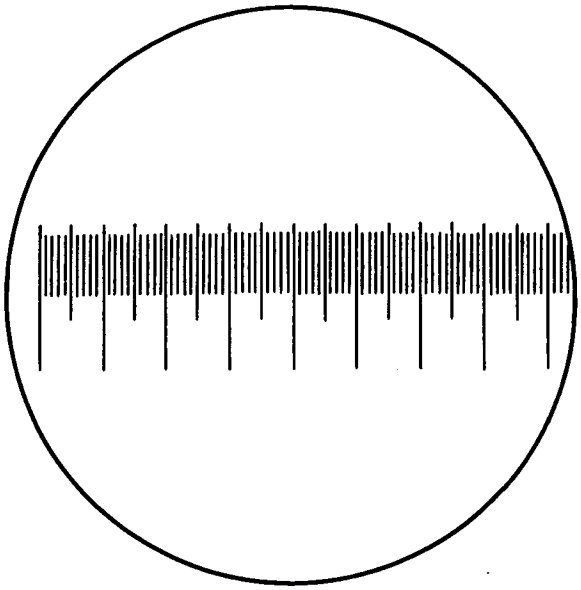

Figure 3. Microscopic View of Calibrated Microscope Reticle Slide

Patent status:

No patent action is contemplated by NASA.

Source: S. Salmirs and
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(LAR-10712)